

IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

PATENT APPLICATION

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Case: **3Com-7/Con(1611.NMD.US.C)**

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Group Art Unit: **2153**

Examiner: **Kenneth Fields**

Title: **METHODS AND APPARATUS FOR MONITORING, COLLECTING,
STORING, PROCESSING AND USING NETWORK TRAFFIC DATA
OF OVERLAPPING TIME PERIODS (as amended)**

Commissioner for Patents
BOX PATENT APPLICATION
Washington, D. C. 20231

S I R:

PRELIMINARY AMENDMENT

Please amend the above-identified patent
application, filed simultaneously herewith, as follows:

IN THE TITLE-

Delete the title and replace with:

--METHODS AND APPARATUS FOR MONITORING, COLLECTING,
STORING, PROCESSING AND USING NETWORK TRAFFIC DATA OF
OVERLAPPING TIME PERIODS--.

IN THE CLAIMS-

To facilitate entry of the following changes, the Applicants have submitted herewith substitute pages providing all the pending claims, as they now stand, incorporating the changes indicated below.

Please cancel claim 7.

Rewrite the following claims:

1 --1. (Amended) A method of processing and storing data in
2 a computer system including processor circuitry, and a data
3 storage device, the method comprising the steps of:

4 storing first and second sets of records in
5 separate first-in, first-out data structures, respectively,
6 on the data storage device, the first and second sets of
7 records being of different data resolutions and
8 corresponding to overlapping periods of time;

9 operating the processor circuitry to receive data
10 collected over a period of time; and

11 operating the processor circuitry to update, in
12 parallel, at least one record in each of the stored first
13 and second sets of records with the received data such that
14 a previous record included in each of the first and second
15 data structures is replaced.

1 12. (Amended) A method of collecting and processing
2 network traffic data, comprising the steps of:

3 periodically collecting network traffic data from
4 a data probe,

5 generating a database of network traffic
6 information from the collected network traffic data, the
7 database comprising a plurality of network traffic data
8 sets of differing degrees of data resolution corresponding
9 to overlapping network traffic time periods,

10 storing each of the plurality of network traffic data
11 sets in a different first-in, first-out data structure
12 wherein a limited amount of data storage space is used for
13 each of the different first-in, first out data structures,
14 updating, in parallel, at least one record in the
15 different first-in, first-out data structures with the
16 collected network traffic data, and

17 overwriting the oldest data records in the first-
18 in, first-out data structure used to store one of the
19 network traffic data sets, when the limited amount of data
20 storage space used for said first-in, first-out data
21 structure is filled with records.

17. (Amended) A system for monitoring network traffic
data, comprising:

 a plurality of network traffic data probes for
collecting network traffic information;

 processor circuitry coupled to the network
traffic probes for receiving data therefrom; and

 a data storage device for storing a network
traffic database generated by the processor circuitry using
data collected by the network traffic data probes, the data
storage device including:

 a plurality of data structures, each data
structure being a first-in, first-out data structure, each
one of the plurality of data structures including network
traffic data:

15 a) stored at a different resolution than the
16 resolution at which network traffic data is stored in the
17 other ones of the plurality of data structures; and
18 b) corresponding to a period of time which overlaps
19 the period of time for which network traffic data is stored
20 in the other ones of the plurality of data structures;
21 means for updating, in parallel, at least one record
22 in the different first-in, first-out data structures with
23 the collected network traffic data, and
24 means for overwriting the oldest data records in the
25 first-in, first-out data structure used to store one of the
26 network traffic data sets, when the limited amount of data
27 storage space used for said first-in, first-out data
28 structure is filled with records. --.

REMARKS

If the Examiner believes that there are any unresolved issues preventing allowance in any of the claims now pending in the application, the Examiner should telephone Ms. Janet M. Skafar, Esq. at (650) 988-0655 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

March 30, 2001



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Date of deposit: April 2, 2001

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Signature of person making certification

Peter L. MICHAELSON

Name of person making certification

What is claimed is:

1 1. A method of processing and storing data in a
2 computer system including processor circuitry, and a data
3 storage device, the method comprising the steps of:

4 storing first and second sets of records in
5 separate first-in, first-out data structures,
6 respectively, on the data storage device, the first and
7 second sets of records being of different data
8 resolutions and corresponding to overlapping periods of
9 time;

10 operating the processor circuitry to receive
11 data collected over a period of time; and

12 operating the processor circuitry to update, in
13 parallel, at least one record in each of the stored first
14 and second sets of records with the received data such
15 that a previous record included in each of the first and
16 second data structures is replaced.

1 2. The method of claim 1,

2 wherein the first and second sets of records
3 are stored in separate first-in, first-out data
4 structures on the data storage device; and

5 wherein the step of operating the processor
6 circuitry to update at least one record in each of the
7 stored first and second sets of records, includes the
8 step of replacing a previous record included in each of
9 the first and second data structures.

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1 3. The method of claim 2, further comprising the step
2 of:

3 allocating fixed amounts of storage space on
4 the data storage device for storing each one of the first
5 and second first-in, first-out data structures used to
6 store the first and second sets of records.

1 4. The method of claim 2, wherein the first set of
2 records include hourly records and the second set of
3 records includes daily records.

1 5. The method of claim 2, further comprising the step
2 of:

3 periodically collecting network traffic data;
4 storing the collected network traffic data in a
5 buffer; and

6 operating the processor circuitry to retrieve
7 network traffic data from the buffer, the retrieved
8 network traffic data being received by the processor
9 circuitry.

1 6. The method of claim 5,

2 wherein the network traffic data stored in the
3 buffer includes time stamp information indicating the
4 period of time in which the network traffic data was
5 collected; and

6 wherein the step of operating the processor
7 circuitry to update at least one record in each of the

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8 stored first and second sets of records includes the step
9 of:

10 examining at least one time stamp included in
11 the buffered network traffic data.

1 8. The method of claim 5,

2 wherein the processor circuitry includes first
3 and second central processing units, and

4 wherein the step of operating the processor
5 circuitry to update at least one record in each of the
6 stored first and second sets of records includes the step
7 of operating the first processor to update the first set
8 of records while operating the second processor to update
9 the second set of records.

1 9. The method of claim 1,

2 wherein the processor circuitry includes first
3 and second central processing units, and

4 wherein the step of operating the processor
5 circuitry to update at least one record in each of the
6 stored first and second sets of records includes the step
7 of operating the first processor to update the first set
8 of records while operating the second processor to update
9 the second set of records.

1 10. The method of claim 5, wherein the computer system
2 further includes a display device, the method further
3 comprising the step of:

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4 displaying data corresponding to overlapping
5 periods of time at different resolutions on the display
6 device.

1 11. The method of claim 1, further comprising the step
2 of:

3 allocating storage space for storing the first
4 and second sets of records in first and second first-in,
5 first-out data structures, respectively.

1 12. A method of collecting and processing network
2 traffic data, comprising the steps of:

3 periodically collecting network traffic data
4 from a data probe,

5 generating a database of network traffic
6 information from the collected network traffic data, the
7 database comprising a plurality of network traffic data
8 sets of differing degrees of data resolution
9 corresponding to overlapping network traffic time
10 periods,

11 storing each of the plurality of network traffic
12 data sets in a different first-in, first-out data
13 structure wherein a limited amount of data storage space
14 is used for each of the different first-in, first out
15 data structures,

16 updating, in parallel, at least one record in the
17 different first-in, first-out data structures with the
18 collected network traffic data, and

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19 overwriting the oldest data records in the
20 first-in, first-out data structure used to store one of
21 the network traffic data sets, when the limited amount of
22 data storage space used for said first-in, first-out data
23 structure is filled with records.

1 13. The method of claim 12, wherein the differing
2 degrees of resolution correspond to measurement time
3 periods of different duration.

1 14. The method of claim 12,
2 wherein the collected network traffic data
3 includes a plurality of traffic data counter values; and
4 wherein each traffic data counter value in the
5 collected network traffic data includes information
6 corresponding to an individual monitored conversation,
7 the step of generating a database including the step of
8 generating from the information on each different
9 monitored conversation, a different record in each set of
10 the plurality of network traffic data sets.

1 15. The method of claim 14, further comprising the step
2 of storing each of the plurality of network traffic data
3 sets in a different first-in, first-out data structure.

1 16. The method of claim 15, wherein a limited amount of
2 data storage space is used for each of the different

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3 first-in, first out data structures, the method further
4 comprising the step of:

5 overwriting the oldest data records in the
6 first-in, first-out data structure used to store one of
7 the network traffic data sets, when the limited amount of
8 data storage space used for said first-in, first-out data
9 structure is filled with records.

1 17. A system for monitoring network traffic data,
2 comprising:

3 a plurality of network traffic data probes for
4 collecting network traffic information;

5 processor circuitry coupled to the network
6 traffic probes for receiving data therefrom; and

7 a data storage device for storing a network
8 traffic database generated by the processor circuitry
9 using data collected by the network traffic data probes,
10 the data storage device including:

11 a plurality of data structures, each data
12 structure being a first-in, first-out data structure,
13 each one of the plurality of data structures including
14 network traffic data:

15 a) stored at a different resolution than the
16 resolution at which network traffic data is stored in the
17 other ones of the plurality of data structures; and

18 b) corresponding to a period of time which overlaps
19 the period of time for which network traffic data is

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20 stored in the other ones of the plurality of data
21 structures;

22 means for updating, in parallel, at least one record
23 in the different first-in, first-out data structures with
24 the collected network traffic data, and

25 means for overwriting the oldest data records in the
26 first-in, first-out data structure used to store one of
27 the network traffic data sets, when the limited amount of
28 data storage space used for said first-in, first-out data
29 structure is filled with records.

1 18. The system of claim 17, wherein each of the
2 plurality of data structures is a first-in, first-out
3 data structure.

1 19. The system of claim 18, wherein each one of the
2 plurality of data structures includes a plurality of data
3 records, each data record corresponding to a monitored
4 network conversation.

1 20. The system of claim 18, wherein data records are
2 arranged within each individual data structure as a
3 function of the time the conversation to which the record
4 corresponds was monitored.

1 21. The system of claim 20, wherein records which were
2 monitored during the same time interval are grouped
3 together within each individual data structure.

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1 22. The system of claim 21, further comprising:
2 means for modifying at least one network
3 traffic data record included in each one of the plurality
4 of data structures to reflect collected information about
5 an individual network conversation.

1 23. The system of claim 18, further comprising:
2 means for modifying at least one network
3 traffic data record included in each one of the plurality
4 of data structures to reflect collected information about
5 an individual network conversation.

1 24. The system of claim 18, wherein the processor
2 circuitry includes a plurality of separate central
3 processing units which operate in parallel.

1 25. The system of claim 24, wherein each one of the
2 plurality of data structures includes a plurality of data
3 records, each data record corresponding to a monitored
4 network conversation.

1 26. The system of claim 24, wherein data records are
2 arranged within each individual data structure as a
3 function of the time the conversation to which the record
4 corresponds was monitored.

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1 27. The system of claim 26, wherein records which were
2 monitored during the same time interval are grouped
3 together within each individual data structure.

1 28. The system of claim 27, further comprising:
2 means for modifying at least one network
3 traffic data record included in each one of the plurality
4 of data structures to reflect collected information about
5 an individual network conversation.

1 29. The system of claim 24, further comprising:
2 means for modifying at least one network
3 traffic data record included in each one of the plurality
4 of data structures to reflect collected information about
5 an individual network conversation.

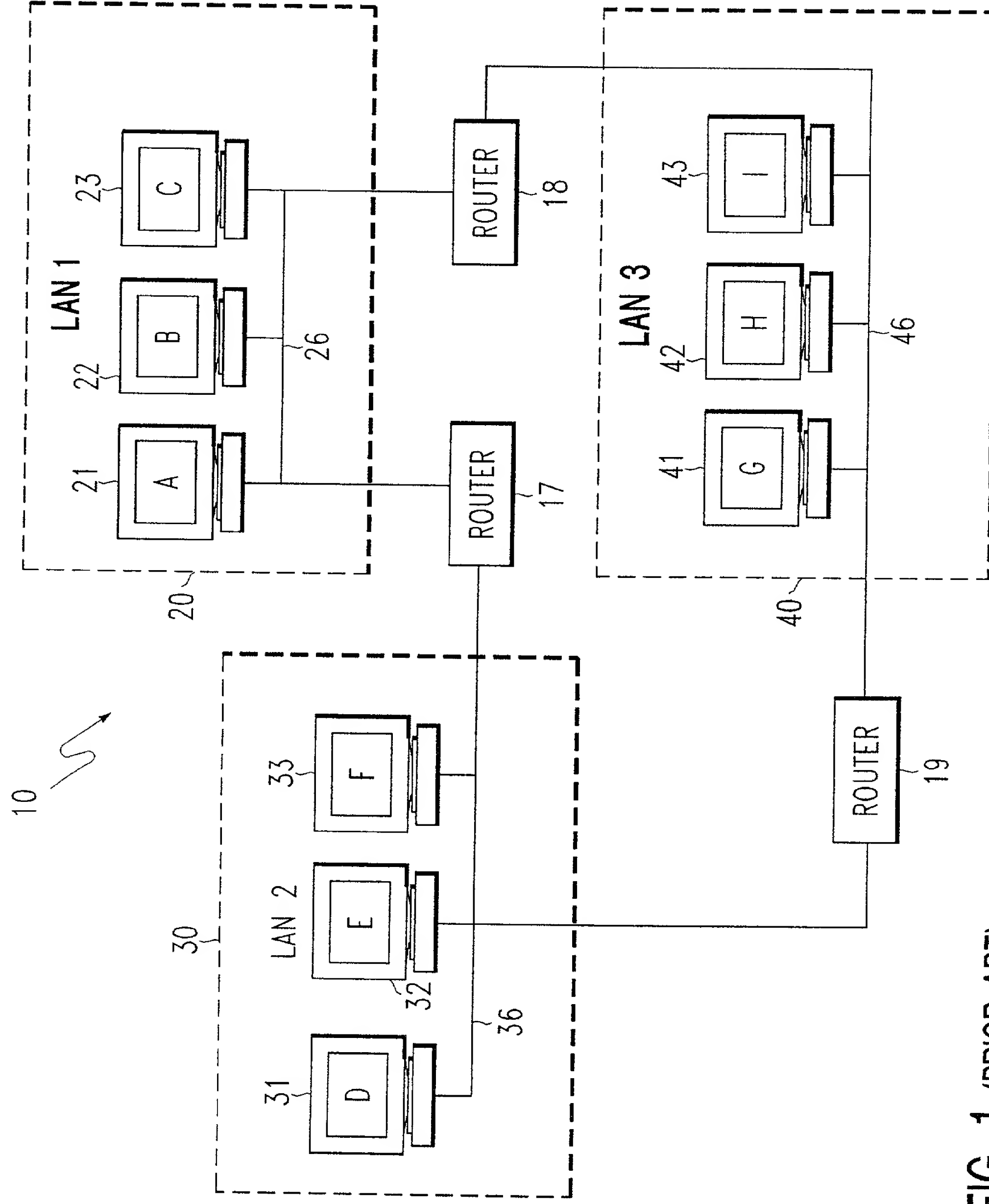


FIG. 1 (PRIOR ART)

FIG. 2

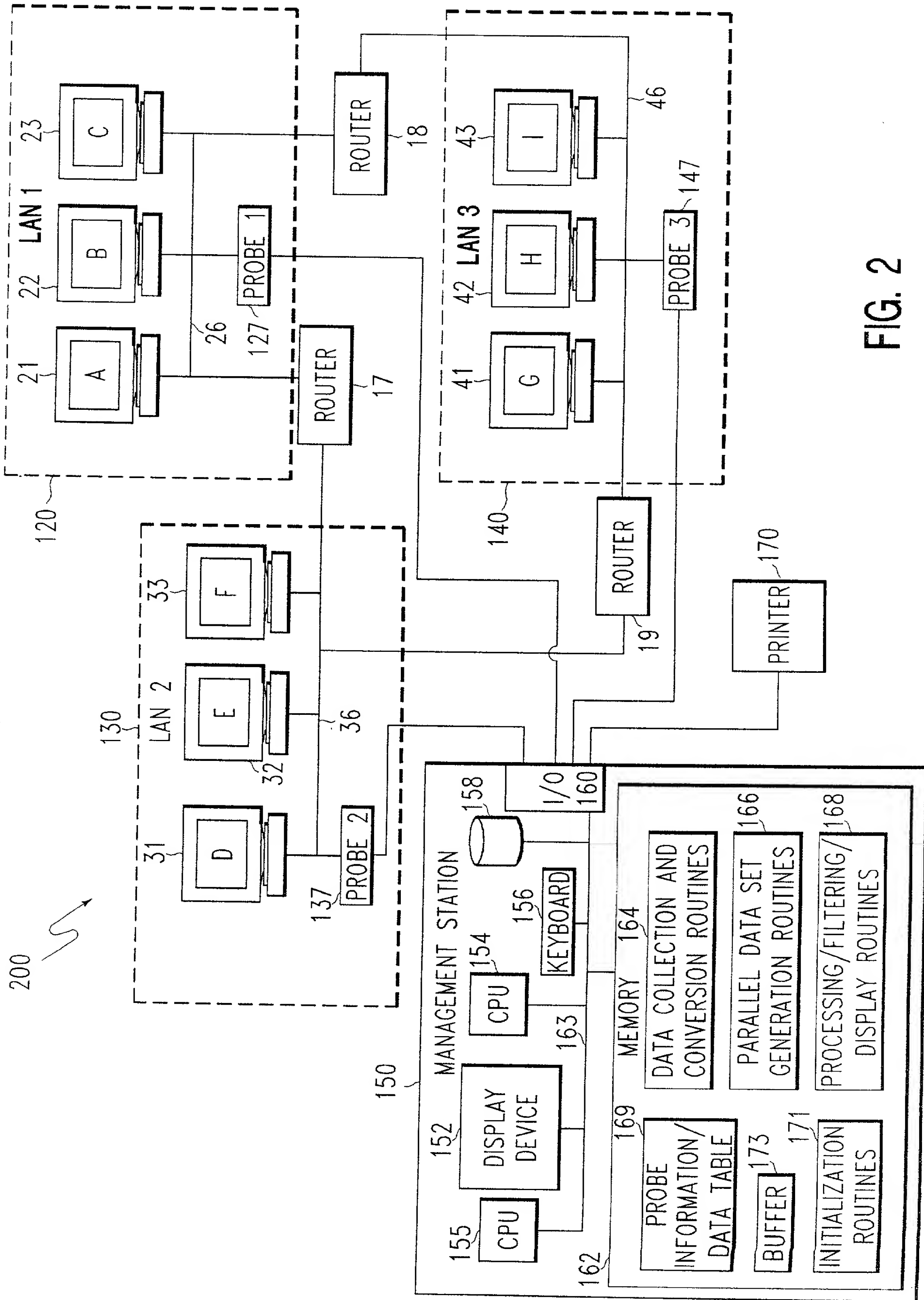


FIG. 2

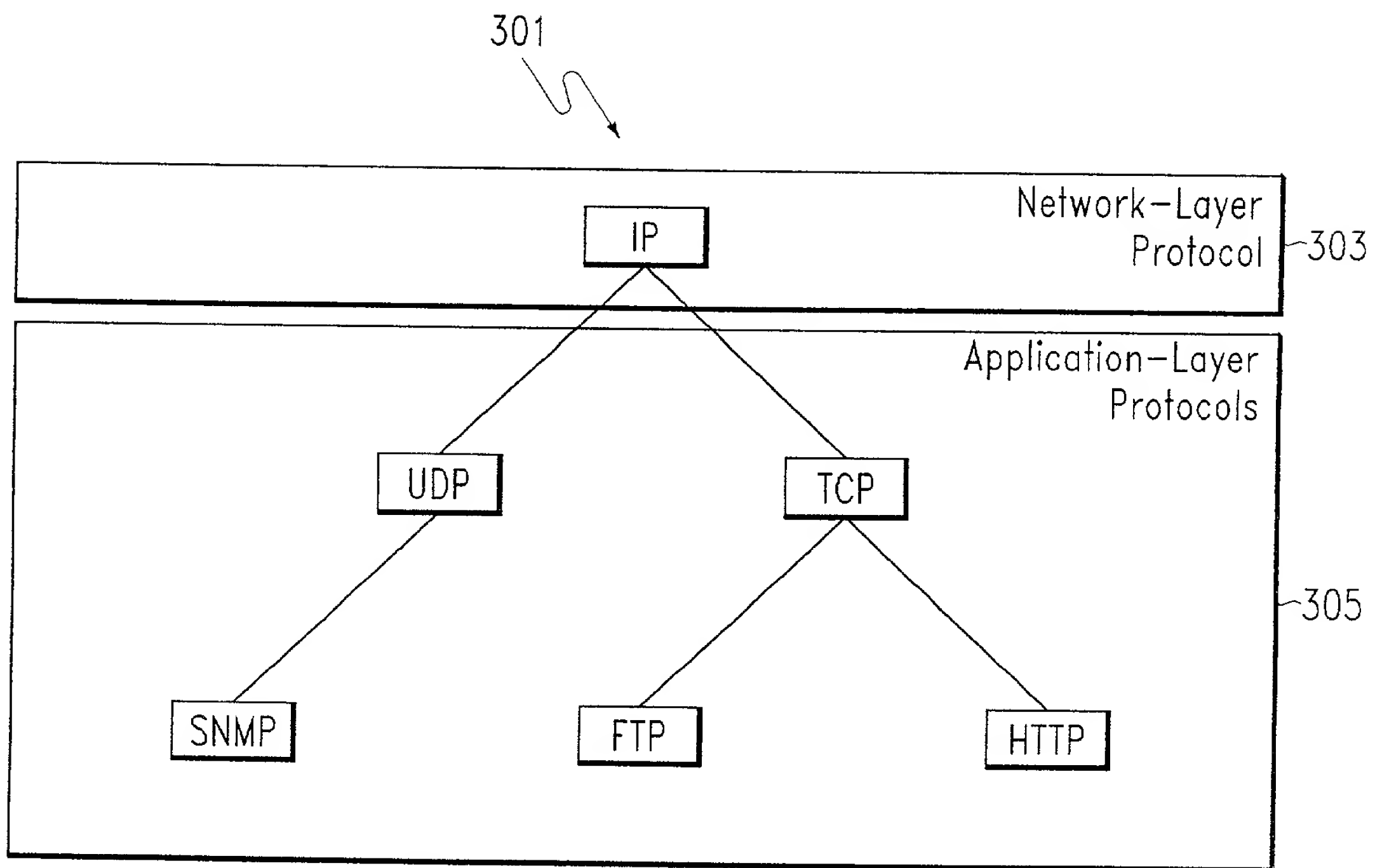
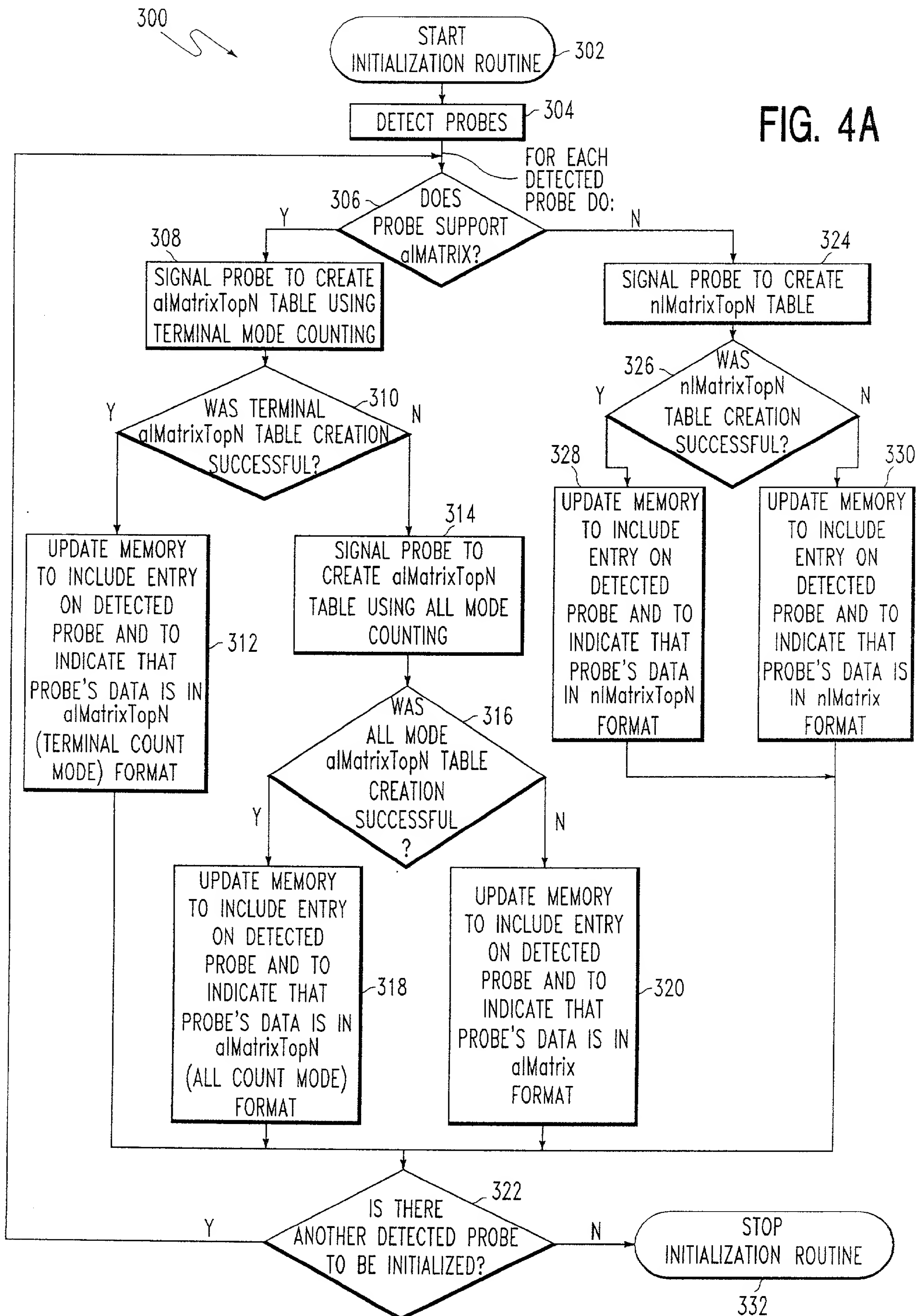


FIG. 3

PROBE IDENTIFIER	PROBE DATA TABLE FORMAT	TEMPORARY DATA TABLE STORAGE
PROBE 1 127	alMatrixTopN(All Count Mode)	TEMPORARY DATA TABLE STORAGE
PROBE 2 137	alMatrix	TEMPORARY DATA TABLE STORAGE
PROBE 3 147	nlMntrix	TEMPORARY DATA TABLE STORAGE

FIG. 4B

FIG. 4A



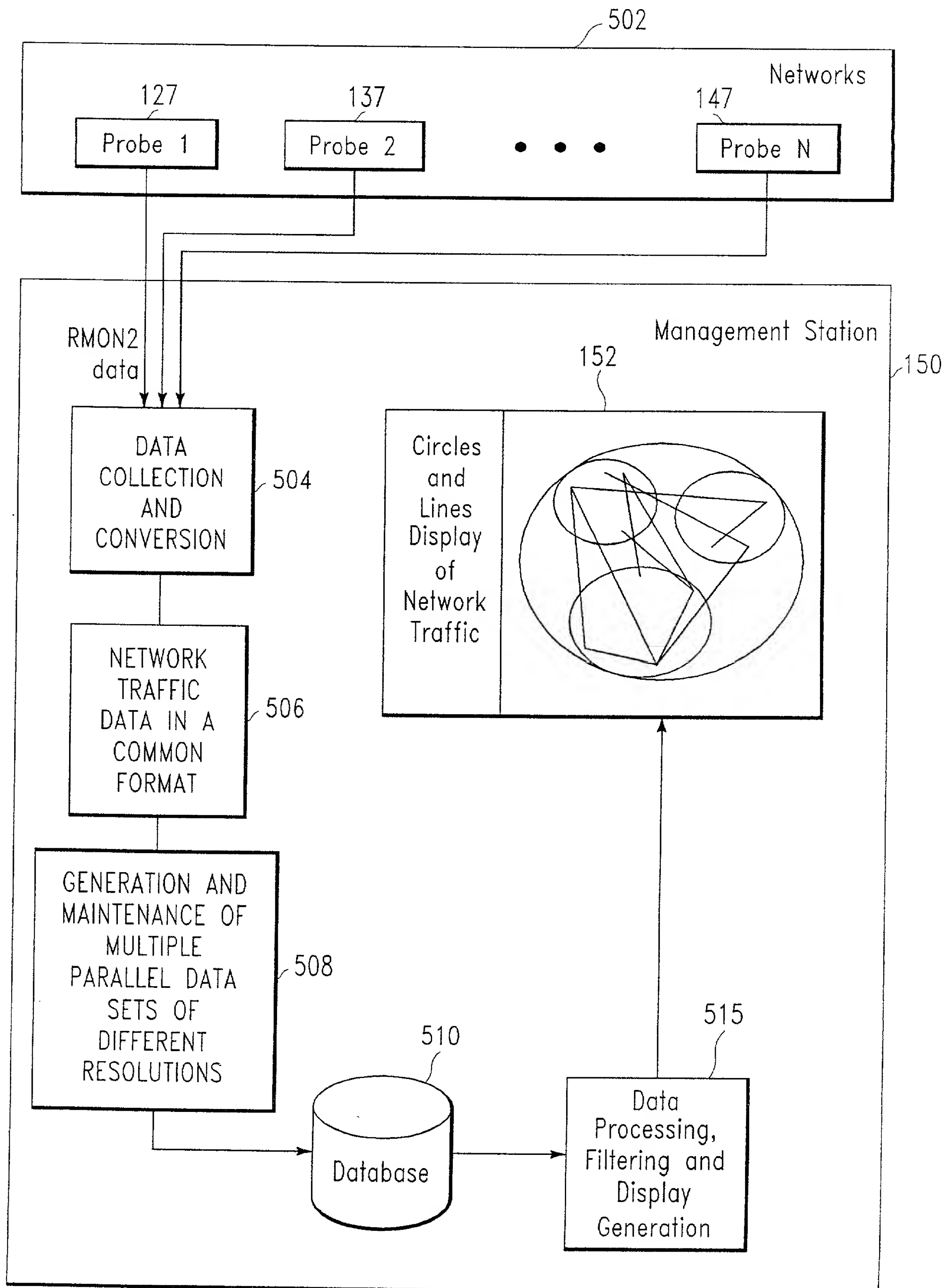
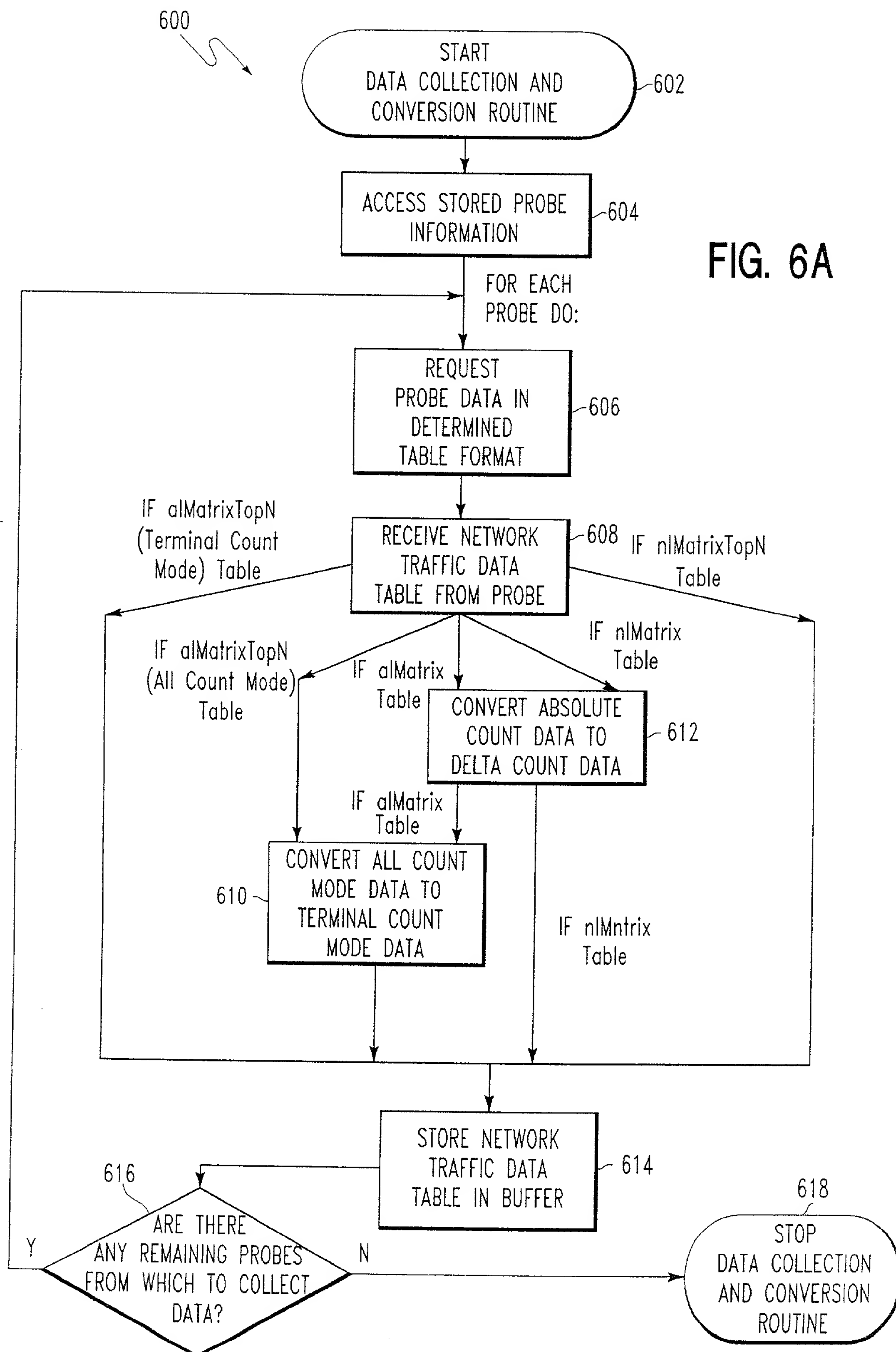


FIG. 5

FIG. 6A



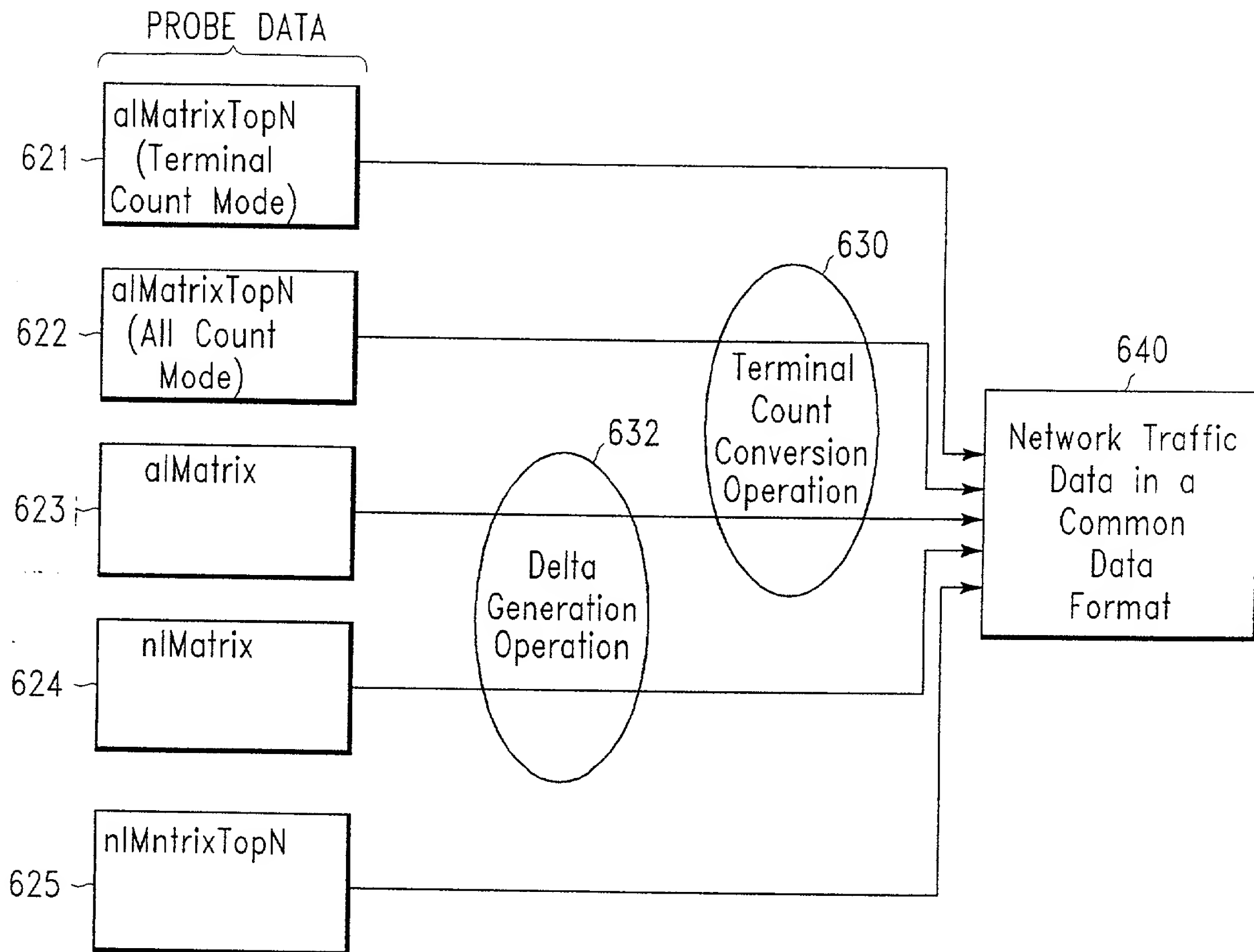


FIG. 6B

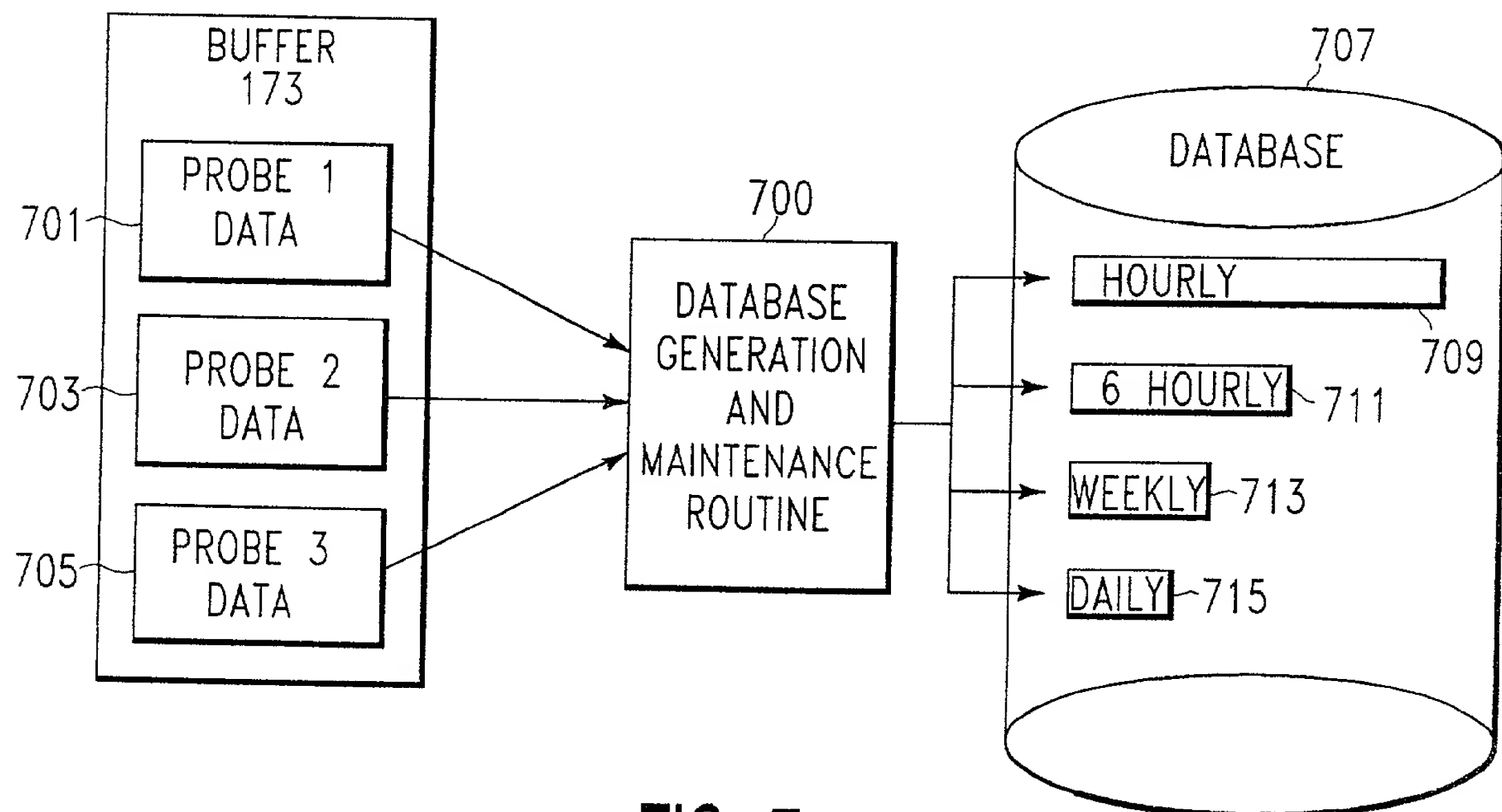


FIG. 7

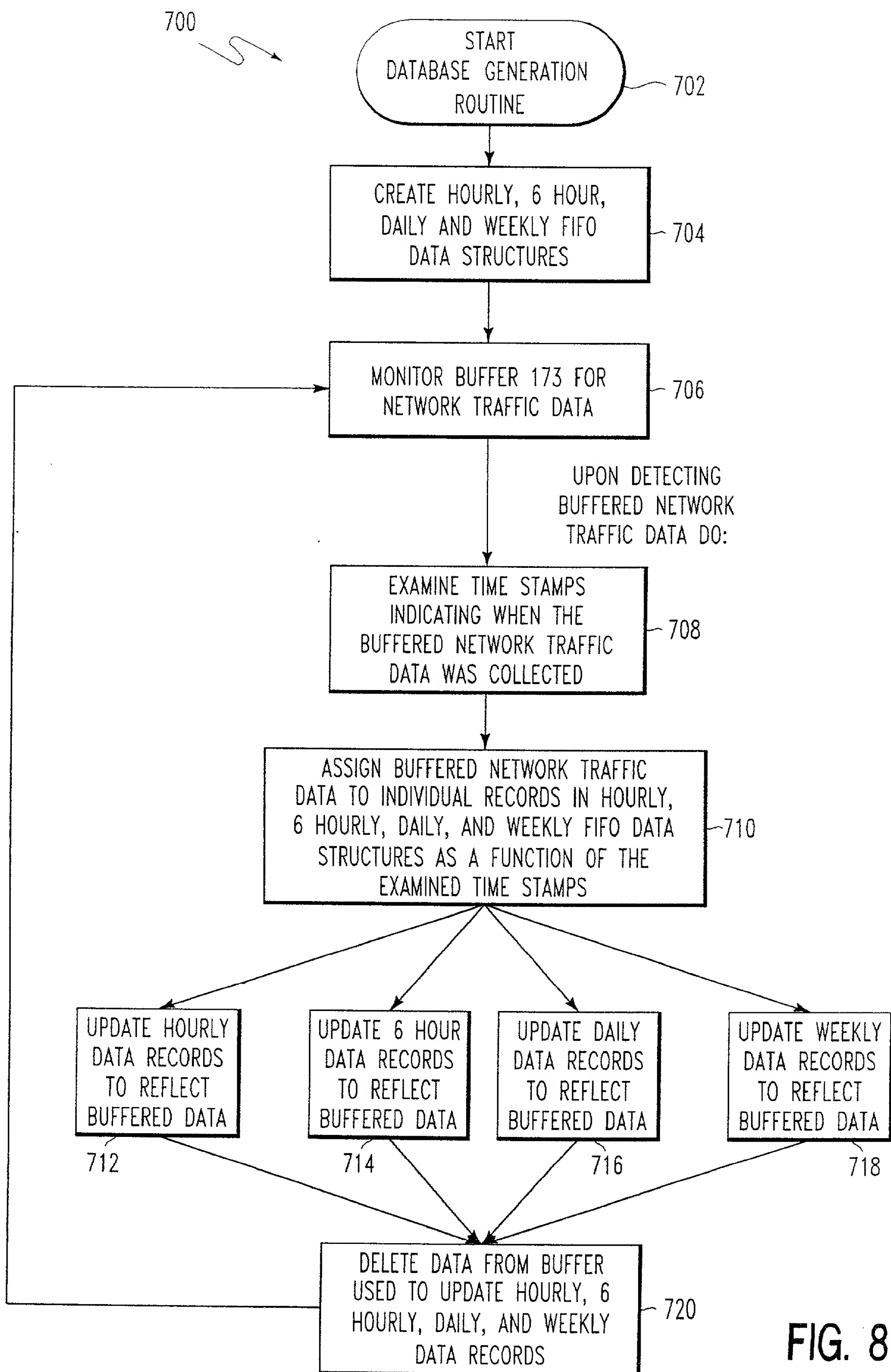


FIG. 8

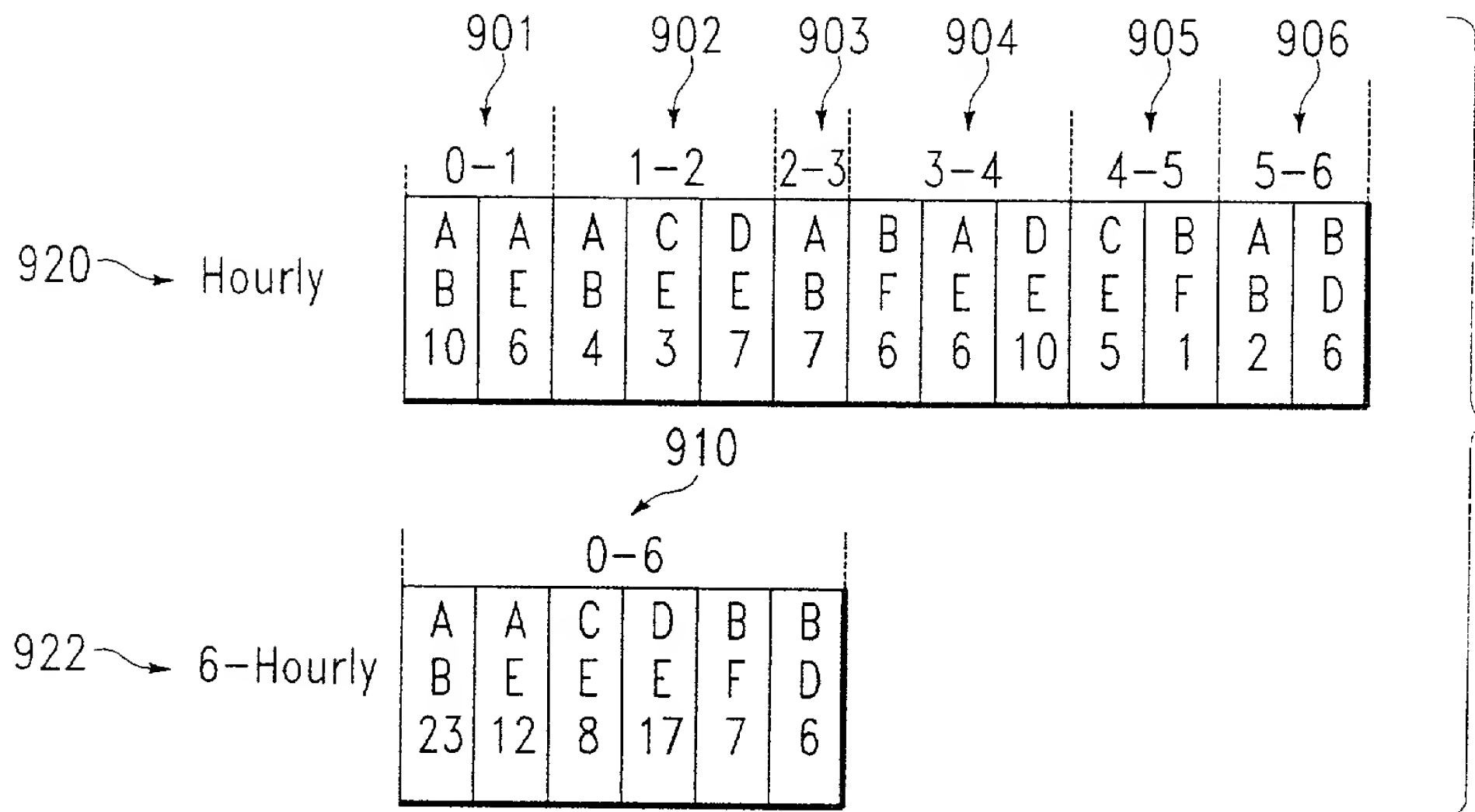


FIG. 9

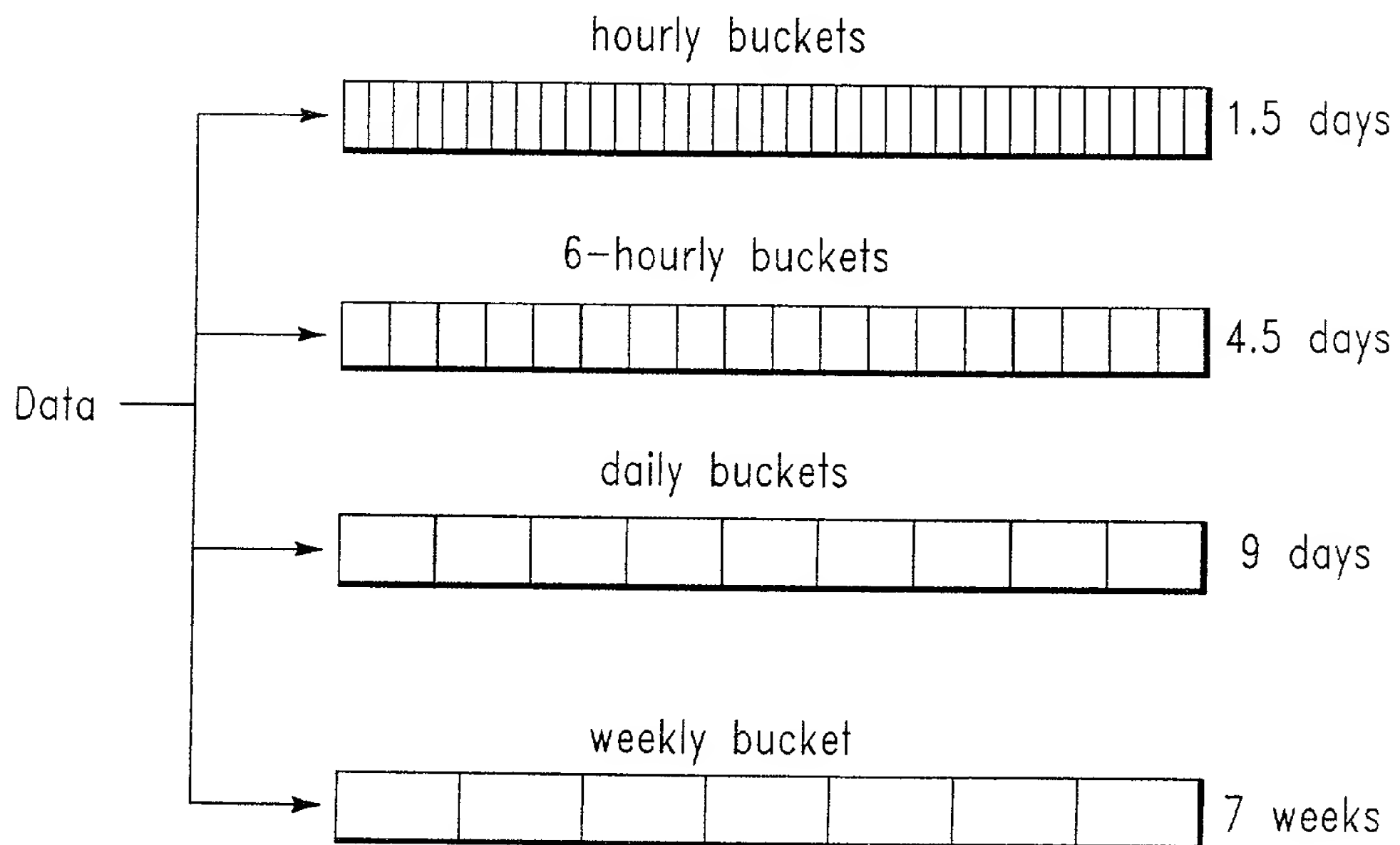


FIG. 10